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### Job Finding, Job Loss and Consumption Behaviour

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**JOB FINDING, JOB LOSS AND  
CONSUMPTION BEHAVIOUR**

By

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# Job finding, job loss and consumption behaviour

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## Abstract

According to the permanent income / life-cycle hypothesis (PILCH), under standard preferences anticipated changes in employment status should not affect the changes in consumption. In this paper, we investigate the consumption behaviour of individuals who lose their jobs and those who find a job. For a representative sample of American households anticipated changes between employment and unemployment states are identified using monthly transition expectations. Firstly, it is shown that expectations have significant predictive power conditional on individual characteristics and a set of time-varying controls. This allows us to use a two-stage estimation strategy, where expectations are used to explain anticipated changes in employment status in the first stage and changes in consumption are regressed on anticipated changes in employment status in the second stage. Secondly, by estimating a first-order approximation of the Euler equation, it is shown that consumption expenditures are not sensitive to either anticipated transition into unemployment or anticipated transition into employment which is in line with the PILCH.

**JEL codes:** E2, J1

**Keywords:** life-cycle model, labour market, expectations

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# 1 Introduction

Economists and policy makers are interested in the question of how income effects of changes in the employment status of household members affect households' consumption behaviour. In particular, a vast literature explores the issue of whether consumption drops at retirement as a result of falling income. In investigating this question, the predictions of the permanent income / life cycle hypothesis (PILCH) developed by Modigliani and Brumberg (1954) and Friedman (1957) are often regarded as a natural benchmark. The PILCH relies on the assumption that rational forward looking consumers use savings to smooth anticipated income fluctuations. The theory, therefore, predicts that consumption decisions should respond only to the unanticipated changes in income whereas anticipated changes in income should have little if any effect on these decisions. By the same token, it is expected that consumption behaviour is sensitive to unanticipated changes in employment status and not to anticipated changes.

Several studies explore whether consumption behaviour is indeed insensitive to anticipated changes in the employment status as the PILCH predicts. An extensive part of the relevant literature focuses on the relationship between retirement and consumption. In the domain of retirement decisions the PILCH predicts that consumption decisions should not be affected by the retirement status to the extent that retirement is a predictable event. Some empirical studies question the validity of this claim and argue that, in contrast with the predictions of the PILCH, consumption expenditures decline considerably at the time of retirement. For instance, Banks et al. (1998) and Bernheim et al. (2001) find that anticipated retirement is associated with significantly lower consumption, which contradicts the PILCH's predictions.<sup>1</sup> To identify the anticipated component of transitions into retirement some studies make use of transition expectations. Haider and Stephens (2007) demonstrate that the subjective retirement expectations are strong predictors of subsequent retirement decisions conditional on the age of the respondent.

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<sup>1</sup>Blau (2008) confirms this finding and argues that the uncertainty about the time of retirement could lead to an abrupt decline in consumption at the time of the retirement. Other studies such as Aguiar and Hurst (2007) and Hurd and Rohwedder (2006) criticise the use of food expenditures as a proxy for total consumption and claim that unlike food expenditures, total consumption follows a smooth trajectory at retirement.

Their results support the claim that consumption drops at retirement even when retirement is fully anticipated.

Some economists coined the term "retirement-consumption puzzle" to define the sudden fall in consumption at retirement and called the assumptions of PILCH into question. A natural question, but one which received much less attention is whether similar puzzles can be observed in the domain of job finding and job loss. In this paper, we focus on the question of whether consumption changes beyond the predictions of PILCH in the cases of job finding and job loss. One reason why the transitions between the employment and unemployment states received relatively less attention may be related to lack of suitable data. In particular, one of the common inadequacies of household consumption surveys is that the time between the two waves of a survey is often considerably longer than the duration of a typical unemployment spell. These surveys are usually conducted on an annual (e.g. Consumer Expenditure Survey) or biennial basis (e.g. Consumption and Activities Mail Survey), while an overwhelming majority of unemployment spells in the U.S. lasts less than six months. Using monthly data from the U.S. Current Population Survey, Farber and Valletta (2013) finds that such cases constitute 86.3% of all unemployment spells taking place between 2009 and 2011. Due to this disparity between the survey frequency and transition frequency it is often not possible to investigate consumption behaviour during the months leading up to the transition and following the transition.

To investigate the consumption behaviour at the time of job finding and job loss, we use a monthly survey of American households on consumption. Monthly surveying allows us to observe the almost immediate consumption response of households to transitions. Furthermore, since the period between two consecutive waves is short we do not have to rely on retrospective data on employment status. Several studies such as Akerlof and Yellen (1985), Mathiowetz and Ouncan (1988), Jürges (2007) find that respondents tend to underreport transitions between the employment states over the past year. Our analysis is not susceptible to such recall errors.

Anticipated job transitions are often measured using instruments such as age, job characteristics, tenure and expectations. In the case of monthly transitions, expectations could play a particularly important role since other potential instruments may not change markedly on a

monthly basis. We use subjective probability questions to measure transition expectations. These questions ask the job seeking respondents about their probability of finding a job whereas the employed respondents are requested to guess their probability of becoming unemployed. We find that there is a positive, statistically significant relationship between the transition expectations and respective realizations conditional on other individual characteristics. This finding gives confidence in the validity of the subjective probability questions as instruments. Since forecast horizons used in the subjective probability questions are rather long, the accuracy of the transition expectations cannot be directly tested. It is nevertheless shown that the monthly probabilities inferred from the responses given to the survey questions are correlated with employment transitions in the following month. This result is in line with Stephens (2004) and Campbell et al. (2007) which find that unemployment expectations predict future unemployment as well as future income even when demographics, job history and characteristics are controlled for. This result is also relevant for the branch of the empirical literature which investigates the usefulness of subjective probabilities for predicting economic and health outcomes. According to the previous literature, subjective survival probabilities predict mortality (Hurd and McGarry, 2002) and consumption behaviour (Salm, 2010), subjective probabilities of receiving a bequest predict inheritance receipt (Brown et al, 2010) and subjective probabilities of rejoining the workforce after retirement predict unretirement behaviour (Maestas, 2010). Our results support the view that subjective probabilities contain private information which is often not captured by observable characteristics of the respondent and his economic environment.<sup>2</sup>

Our self-administered monthly survey is a part of the American Life Panel (ALP) and includes questions on consumption expenditures in six categories as well as questions on employment and unemployment expectations. At first the anticipated employment and unemployment measures are obtained by fitting the labour market expectations on labour market outcomes. These anticipated transition measures are then used to test the PILCH. It is shown that expectations have significant predictive power conditional on individual characteristics and a set of time-varying con-

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<sup>2</sup>Manski (2004) is one of the first studies to advocate the use of survey questions to measure expectations instead of relying on the revealed preference approach.

trols. This result allows us to use a two stage estimation strategy, where expectations are used to explain anticipated changes in employment status in the first stage and changes in consumption are regressed on anticipated changes in employment status in the second stage. Next, by estimating a first-order approximation of the Euler equation, we show that consumption expenditures are not sensitive to either anticipated employment or anticipated unemployment.

The data suggests that both income and consumption considerably fall when the respondents lose their jobs and increase when the respondents find a job. Compared to income, consumption is less responsive to the changes in the employment status which suggests that consumption is smoothed at least to some extent. It is found that, conditional on individual characteristics and other controls, after unemployment income drops by 28.7% whereas total consumption expenditures decrease merely by 6.7%. Job finding is associated with an increase of 39.2% in income and 5.7% in consumption expenditures. Unlike total consumption expenditures, food expenditures do not change significantly after the transitions. This observation contradicts the claim that food-expenditures are particularly sensitive to the employment status due to home-production.<sup>3</sup> According to the PILCH, the sensitivity of consumption to unemployment and employment could be driven by the fact that these transitions are not fully anticipated. If consumption changes only due to the unanticipated nature of the transitions, consumption should no longer depend on the labour market status once these unanticipated changes are filtered out using the labour market expectations. A closer analysis reveals that anticipated job finding and job loss are not associated with a significant change in consumption expenditures. Therefore, according to the results, the change in consumption at the time of transitions is compatible with the PILCH.

The rest of the paper is organized as follows: Section 2 describes the data, section 3 focuses on the trajectories of subjective transition probabilities and income before and after the transitions, section 4 explores whether subjective transition probabilities predict transitions, sections 5 and 6 investigate the changes in income and consumption at the time of the transitions respectively

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<sup>3</sup>Aguiar and Hurst (2005, 2007), Hurd and Rohwedder (2006) examine the role of home-production in the context of retirement. They argue that retirees might prefer preparing their food at home which could lead to a decline in food expenditures at retirement. It is conceivable that home-production plays a similar role in the case of unemployment.

and section 7 concludes.

## 2 Data and Descriptive Statistics

**Table 1:** Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Become employed	0.012	0.108	0	1	34035
Become unemployed	0.010	0.098	0	1	34035
Spouse become employed	0.015	0.122	0	1	34035
Spouse become unemployed	0.007	0.085	0	1	34035
Job loss probability (6 months)	0.149	0.216	0	1	34035
Job finding probability (12 months)	0.042	0.162	0	1	34035
Household income (\$)	4284.74	12676.05	0	1034163.50	34035
Single	0.352	0.478	0	1	34035
Household size	1.066	1.344	0	10	34035
Health condition	2.480	0.810	1	5	34035
Age	47.817	12.243	18	83	34035
Household food consumption (\$)	511.81	5889.07	0	1039595	34035
Total consumption (\$)	880.89	6234.59	4.13	1039729	34035

We use 41 waves of American Life Panel (ALP), which is a self-administered survey conducted via the Internet on a monthly basis covering the period from November 2009 to March 2013. Respondents without Internet access are provided either a small laptop or a Web TV with Internet access. The surveys are conducted within the first ten days of each month. One of the novel features of the survey is the verification screen which should be completed by the respondents at the end of each section. This screen allows the respondents to view their responses in one place and correct their mistakes before they proceed to the next section. Hurd and Rohwedder (2012) indicate that the reporting errors are reduced substantially thanks to this verification procedure. They also examine the reliability and representativeness of the ALP survey by comparing the level of total household consumption expenditures in ALP and Consumption Expenditures Survey (CEX). They report that the total spending levels in the year 2010 match closely in these two surveys which gives confidence in the data collection method that is used in ALP.

In Table 1 we report the descriptive statistics for the consumption measures, income, labour



market transition indicators, transition expectations as well as some relevant household and respondent characteristics. The household characteristics include changes in the labour market status of spouses, household size and health status. The health indicator is based on each respondent's subjective assessment of her own health rated on a 5-point Likert scale.

The respondents are asked to report their labour market status at the time of the interview whereas income and consumption questions concern household income and spending during the calendar month before the interview. We take the lead of the spending and income variables so that the definitions of labour market status, income and consumption are compatible with each other. That is to say, consumption and income at time  $t$ , denoted by  $c_t$  and  $Y_t$ , correspond to the spending and income data collected in month  $t + 1$  and measure spending and income in month  $t$ .

Out of the 51876 observations in the initial ALP sample, we exclude 17862 observations because the respondent is not in the workforce. The final sample contains 34035 observations collected from 2398 respondents. Below we describe the sample statistics in more detail.

## 2.1 Consumption measures

Two different definitions are introduced to measure consumption expenditures of households. The total consumption variable corresponds to the most comprehensive definition and consists of self-reported non-durable consumption expenditures in six categories during the calendar month before the interview. This consumption measure is based on the non-durable consumption definition in Salm (2010) and excludes relatively durable consumption items such as housekeeping equipment as well as expenses which may not be easily adjustable on a monthly basis, such as rent and utility expenditures. The included categories are dining out, food, clothing, entertainment, gasoline and other transportation spending which together constitute 30.62% of the total non-durable consumption expenditures. We exclude relatively durable consumption items such as gardening and yard supplies and cleaning and laundry products; and expenditures which can be categorized as investment rather than consumption such as education and healthcare related

spending.

The second consumption definition is based on food expenditures which is the only available consumption variable in the Panel Study of Income Dynamics (PSID) survey and is commonly used as a proxy for total consumption (e.g. Bernheim, Skinner, and Weinberg 2001; Lundberg, Startza and Stillman 2003; Stephens 2004; Haider and Stephens 2007). Both consumption measures are converted to November 2009 dollars using the urban CPI index for non-durables published by the Bureau of Labour Statistics.

## 2.2 Employment and unemployment measures

Throughout the analysis, only the non-working respondents who look for a job are regarded as unemployed. The respondents who are temporarily laid off are not regarded as either employed or unemployed, since they do not report either their job loss or job finding expectations.

In section 6, we test one of the key predictions of the PILCH which concerns the change in consumption. Accordingly, we are interested in the changes in the labour market status rather than the labour market status itself. To capture the changes in the employment status, we introduce two binary variables which are referred to as "Become employed" and "Become unemployed". A change in the employment status is categorized as a transition only if the respondent has been observed for two consecutive months. In total we identify 315 transitions from the unemployment to the employment state and 291 transitions from the employed to the unemployed state. According to Table 1 this means that 1.2% of the observations corresponds to periods in which unemployed individuals find a job and another 1.0% corresponds to periods in which employed individuals lose their jobs.

## 2.3 Expectations

Employed and unemployed respondents make 6-month and 12-month predictions respectively whereas surveys are conducted on a monthly basis. The questions are worded as follows:

- *On a scale from 0 percent to 100 percent where "0" means that you think there is absolutely*

*no chance, and "100" means that you think the event is absolutely sure to happen, what are the chances that you will lose your job during the next 12 months?*

- *On a scale from 0 percent to 100 percent where "0" means that you think there is absolutely no chance, and "100" means that you think the event is absolutely sure to happen, what are the chances that over the next 6 months you will find a job that you would accept considering the pay and the type of work?*

It should be noted that the first question exclusively deals with involuntary unemployment. The implications of using this particular definition is discussed later on. Since the forecast horizon is considerably longer than the period between two consecutive surveys and attrition is quite common in our sample, unfortunately it is impossible to check the accuracy of the predictions in most of the cases. To overcome this problem, half-yearly and yearly predictions are converted to monthly predictions in a way as explained in detail below. One potential advantage of having longer forecast horizons is that focal responses are less likely when respondents make a 6-month or 12-month prediction rather than a 1-month prediction. As the horizon gets shorter, the transition probabilities may get closer to zero and focal responses may be more common. In our sample 17.9% of 12-month subjective unemployment probabilities and 4.5% of 6-month subjective employment probabilities are equal to 0. It is plausible that such extreme predictions would constitute an even larger fraction of the sample, if the forecast horizons used in the questions were 1 month.

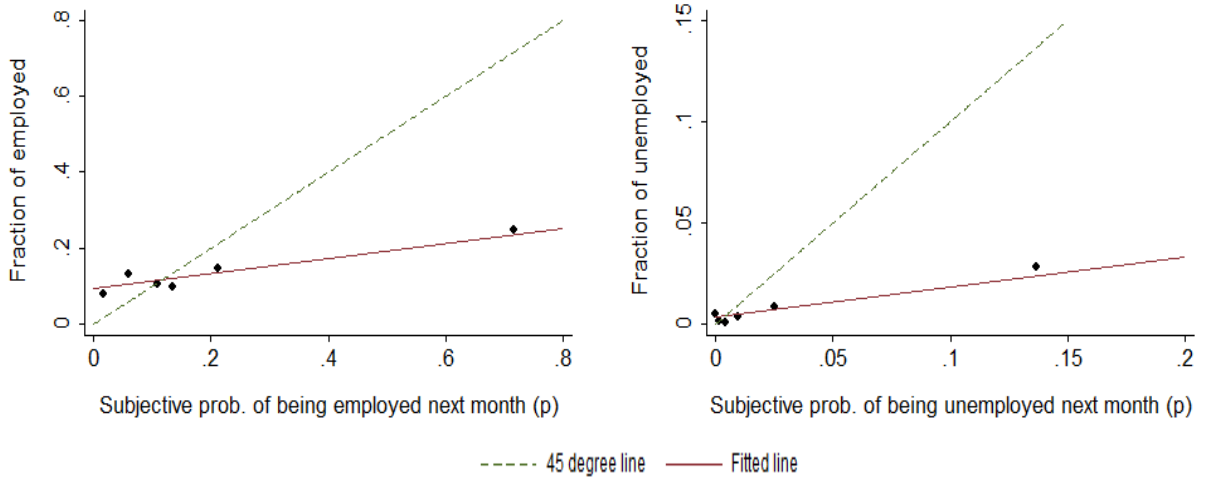
Expectations can be used to distinguish between anticipated and unanticipated transitions only if they predict future transitions rather well. To examine this question subjective transition probabilities are compared with realizations. As mentioned, since it is not possible to track most individuals throughout the forecast horizons yearly and half-yearly transition probabilities are converted to monthly transition probabilities. To make this conversion it is assumed that according to the respondent, the probability of transition to the new state is the same in each future month conditional on being in the original state at the beginning of the month. It is further assumed that once the transition takes place the respondent stays in the new state until

the end of the forecast horizon. This means that the probability of being in the original state in a given month is characterized by a Bernoulli process, such that:

$$P(X_k) = \sum_{j=1}^k p(1-p)^{j-1} = 1 - (1-p)^k \quad (1)$$

where  $P(X_k)$  is the probability of not being in the initial labour market state after  $k$  months and  $p$  is the monthly subjective transition probability from the original state to the new state conditional on being in the original state at the beginning of the month. In equation (1),  $P(X_k)$  corresponds to the probabilities reported by the respondents and  $p$  denotes the inferred probabilities. The value of  $k$  depends on the length of the forecast horizon, hence the initial labour market state of the respondent. For instance, if the original state of the respondent is unemployed,  $P(X_k)$  will denote the probability of being employed at the end of the forecast horizon,  $p$  will be the monthly subjective transition probability of finding a job given that the individual is unemployed at the beginning of the month, and  $k$  will be 12 since the respondent will make a 12-month prediction.

**Figure 1:** Subjective transition probabilities and realizations



Based on equation (1) we compute the monthly subjective probabilities ( $p$ ) and find that the average subjective job-finding and job-loss probabilities are 0.15 and 0.03 respectively. We then relate these monthly subjective probabilities to the employment status in the next month. We

find that, on average, the subjective probability of finding a job is close to the fraction of the unemployed finding a job next month (13.31%). On the other hand, the subjective probability of job loss is considerably higher than the fraction of the employed respondents who made a transition to unemployment in the next month (0.78%).

To demonstrate the distribution of subjective probabilities the sample is divided into six roughly equal parts. The average monthly subjective employment (unemployment) probability of each sextile is plotted against the fraction of employed (unemployed) in the next month in Figure 1. In the absence of aggregate shocks and voluntary quitting these two measures are expected to be equal and therefore the observations should lie around the dashed lines. In both left and right panels, the slope of the fitted lines are positive indicating that subjective probabilities and transitions are correlated in the expected direction. However, since the slopes of the fitted lines are much below 1, the correlations are weaker than expected. The figure also shows that monthly subjective job loss probabilities and monthly subjective job finding probabilities are distributed rather unevenly and concentrate close to 0. Both unemployment expectations and employment expectations are positively correlated with respective realizations. However, in both cases observations are considerably away from the dashed line. Furthermore, forecast errors, measured by the gap between subjective transition probabilities and the 45 degree line do not seem to be random. For instance, unemployed respondents with a relatively higher subjective probability of job finding overestimate, whereas those with a relatively lower subjective probability of job finding underestimate their probability of job finding. A similar pattern is observed in the case of job loss where lower subjective probabilities are associated with underestimation while higher subjective probabilities are linked to overestimation.

Some of the patterns illustrated in the right panel of Figure 1 are in line with the findings of Stephens (2004) and Dickerson and Green (2012). Firstly, both of these studies report that there is a positive relationship between subjective and actual job loss probabilities. Secondly, in both studies the fitted line which captures the relationship between subjective and actual job loss probabilities is found to be flatter than the 45 degree line. We observe both of these features in our data which gives some confidence in the calculated subjective 1-month probabilities.

Dickerson and Green (2012) also examine the relationship between the subjective job finding probabilities and employment. They find that a higher subjective probability of finding a job as good as the old one is associated with a higher likelihood of finding a job. The findings reported in left panel of Figure 1 are in line with their finding. One drawback of the predicted employment measure in Dickerson and Green (2012) is that it lacks a specific time horizon. Due to this limitation, employment predictions cannot be directly compared to actual employment rates. In our case, the expectation and realization variables refer to the same period and therefore they can relatively easily be related.

In the case of subjective employment probabilities, the average subjective job-finding probability of the first sextile is particularly large. This may stem from the fact that those who give the focal response of "0" to subjective probability questions predict their actual transition probabilities poorly. Gan et al (2005) find a similar pattern in the domain of subjective survival probabilities and conclude that focal responses themselves may carry information about the actual survival probabilities. As it is noted by the authors, focal responses could lead to a spurious relationship between consumption and subjective probabilities if the likelihood of giving focal responses is related to respondent's consumption preferences. It is, therefore, of interest whether there is such a relationship between focal responses and consumption preferences. In a more recent study, Kleijnans and van Soest (2014) examine the responses given to subjective probability questions where the respondents are asked to make predictions about economic decisions and outcomes such as their probability of working after a certain age as well as their probability of leaving and receiving bequests. According to their findings, the relationship between subjective probabilities and demographic characteristics is largely unchanged when focal responses and item non-response are taken into account. Since consumption preferences are often proxied by the respondent's demographic characteristics, this finding supports the view that the effect of focal responses on consumption preferences is negligible. In the face of their findings, we do not treat the focal responses differently throughout our analysis.

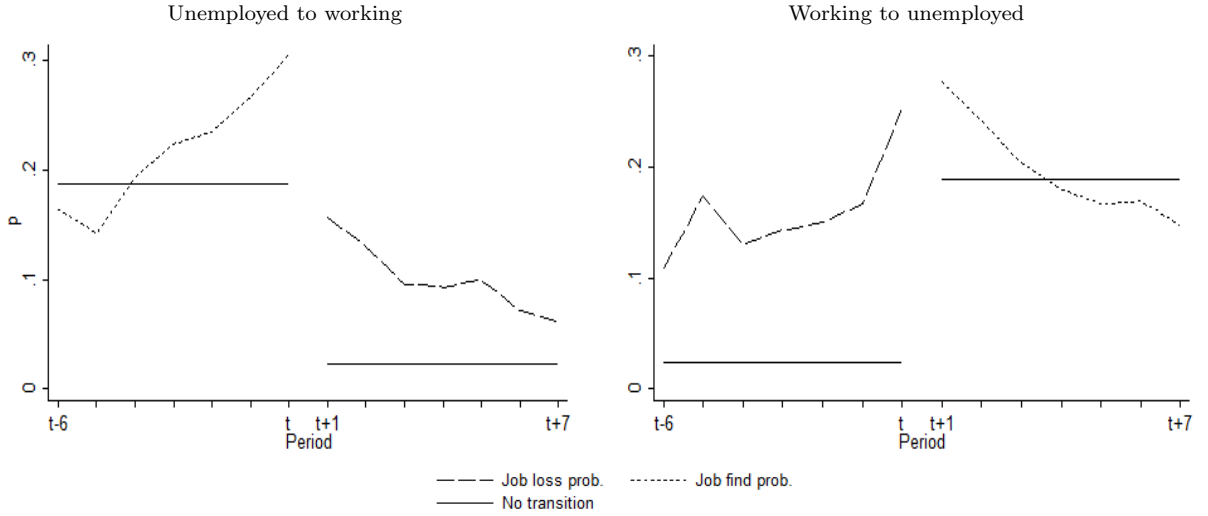
Several factors could explain the gap between the expectations and realizations. We discuss some of these potential causes only briefly since these topics are beyond the scope of our paper.

Firstly, since the respondents do not report all the changes in their employment status since the previous wave, it is possible that some employment and unemployment spells which last shorter than one month are undetected. This phenomenon would cause both fitted lines to shift to the right of the dashed line. Secondly, aggregate economic shocks could drive a wedge between the transitions expectations and realizations. It is likely that such shocks will shift the two fitted lines in opposite directions. For instance, in the case of adverse labour market shocks job finding probabilities will be overestimated while job loss probabilities will be underestimated on average. Thirdly, we exclusively measure the subjective probability of involuntary unemployment which excludes the possibility that the respondents quit voluntarily. Not including voluntary transitions would shift the fitted unemployment line to the left of the 45 degree line. Fourthly, even if the transition expectations are, on average, accurate, the respondents may voluntarily or involuntarily misreport their expectations. In the domain of subjective probabilities misreporting behaviour often takes the form of giving focal responses. The combined effect of the focal responses and the conversion procedure described above is ambiguous. Fifthly, the inferred monthly probabilities should be viewed with caution since their derivation is based on a number of simplifying assumptions. It is plausible that the likelihood of transition in a given month depends on an individual's labour market history. For example, if the probability of finding a job in the next month is  $p_{t+1}$ , the probability of finding a job in the following month given that a job could not be found in the first month ( $p_{t+2}$ ) may be less than  $p_{t+1}$ . If this is the case, the procedure characterized by equation (1) may result in a downward bias in monthly subjective transition probabilities. Finally, it may also be the case that the rational expectations hypothesis itself does not hold. Given the data limitations we cannot conclude which combination of factors explains the expectation-realization gap. We argue that these considerations seem to be negligible for our purposes since we treat these inferred one-month probabilities as instruments rather than explanatory variables. Therefore, as long as the biases that are discussed above are unrelated with consumption preferences, they can be neglected. It is also worth mentioning that the estimation results reported in the later sections are virtually unchanged when the original responses are used instead of the inferred one-month probabilities. This gives some assurance that the use of inferred

probabilities instead of the original subjective responses do not affect the results considerably.

### 3 Subjective transition probabilities and income before and after transitions

**Figure 2:** The average subjective transition probabilities before and after the transitions



Notes: The transition takes place between period  $t$  and  $t+1$ . In periods before  $t$ , the average is taken over individuals who are in the original state and in periods after  $t+1$  it is taken over individuals who are in the post-transition state.

The analysis in the previous section suggests that the labour market transition expectations are correlated with the respective realizations. Another way to investigate the usefulness and accuracy of the subjective transition probabilities is to explore the trajectory of these probabilities around the labour market transitions. If the subjective transition probabilities have predictive power, one may expect, for instance, to observe an increase in these probabilities as the transition event gets closer.

Figure 2 exhibits the subjective transition probabilities before and after transitions. The transition from unemployment to employment is examined in the left panel and the transition from employment to unemployment is investigated in the right panel. Therefore, in the left panel, we consider only the respondents who become employed whereas in the right panel we



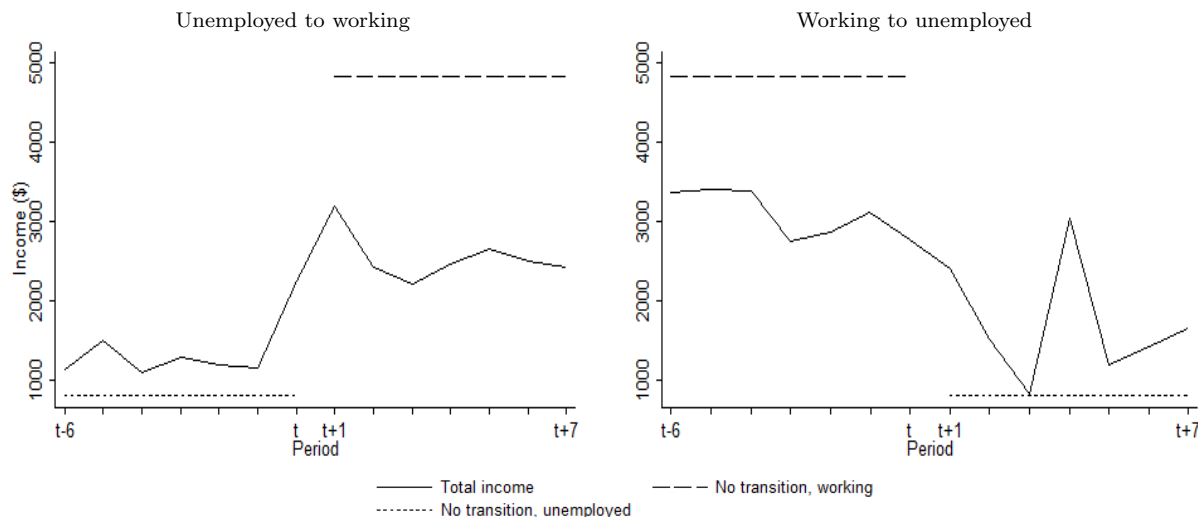
consider only the respondents who become unemployed during the period of interest. In both left and right panels  $t$  denotes the last month before the transition and  $t+1$  is the first month after the transition. According to this definition, month  $t-k$  can be described as the  $k+1$  th month before the transition and  $t+m$  is the  $m$  th month after the transition. For each month before the transition the dotted line indicates the average subjective transition probabilities of the respondents who are in the pre-transition state. In similar fashion, for each month after the transition the dashed line gives the average subjective transition probabilities of the respondents who remain in the new transition state. The solid lines in Figure 2 depict the average subjective job-finding and job-loss probabilities of individuals who are either unemployed (top lines) or employed (lower lines) throughout the period of interest.

According to Figure 2, the average subjective job finding probability of the unemployed respondents increases as the respondents get closer to the transition month. During the 7 months before the transition from unemployment to employment, the subjective probability of finding a job increases from 0.16 to 0.30. Likewise, the average subjective job loss probability of employed respondents increases as they get closer to the transition month. Their job loss probabilities increase from 0.10 seven months before the transition to 0.25 one month before the transition. Both of these patterns suggest that subjective probabilities convey useful information about future transitions. The figure also suggests that the subjective probability of finding a job is higher for individuals who eventually find a job compared to those unemployed individuals who do not find a job during the period of interest. In similar fashion, the subjective probability of becoming unemployed is higher for individuals who lose their jobs compared to those who do not lose their jobs. These differences between the transition and no-transition groups are consistent with the claim that the subjective transition probabilities contain useful information.

The path of the subjective transition probabilities after the transitions may also be of interest. Figure 2 indicates that after the transition from employment to unemployment, the subjective job finding probability gradually decreases and converges to about 20%. A similar pattern is found in the case of job finding where the average subjective job loss probability decreases sharply during the first five months of the employment spell. These findings suggest that the subjective

transition probabilities may to some extent depend on the recent labour market history of the individual. In particular, the more time the respondents spend in their new labour market state after the transition, the more they seem convinced that they will remain in this new state and the closer they get to the no-transition benchmark.

**Figure 3:** The average monthly household income before and after the transitions



Notes: The transition takes place between period  $t$  and  $t+1$ . In periods before  $t$ , the average is taken over individuals who are in the original state and in periods after  $t+1$  it is taken over individuals who are in the post-transition state.

In addition to the trajectory of the subjective transition probabilities, we are also interested in the changes in household income and consumption expenditures around the transitions. By comparing the changes in household income and consumption expenditures we can have a first idea about the extent to which the households smooth consumption when the respondents become employed or unemployed. Figure 3 illustrates the trajectory of monthly average household income around transitions. The income measure used in this figure is the sum of working and non-working income of the respondent and, if present, his/her spouse. As before, periods  $t$  and  $t+1$  denote the last period before and first period after the transitions, respectively. The trajectory of income, indicated by the solid line, suggests that, as could be expected, the average household income increases when the individual finds a job and decreases when he loses his job. Furthermore, both transitions are followed by a period of gradual adjustment in income after which income seems

to become more stable. In the first two months after becoming unemployed average household income decreases, whereas an increase in household income is observed in the first month after becoming employed. Given that the surveys are completed within the first ten days of a month it is possible that the monthly changes in the income measure at the time of the transition do not fully reflect the actual income change due to the transition. This may also lead to the gradual adjustment pattern observed in Figure 3.

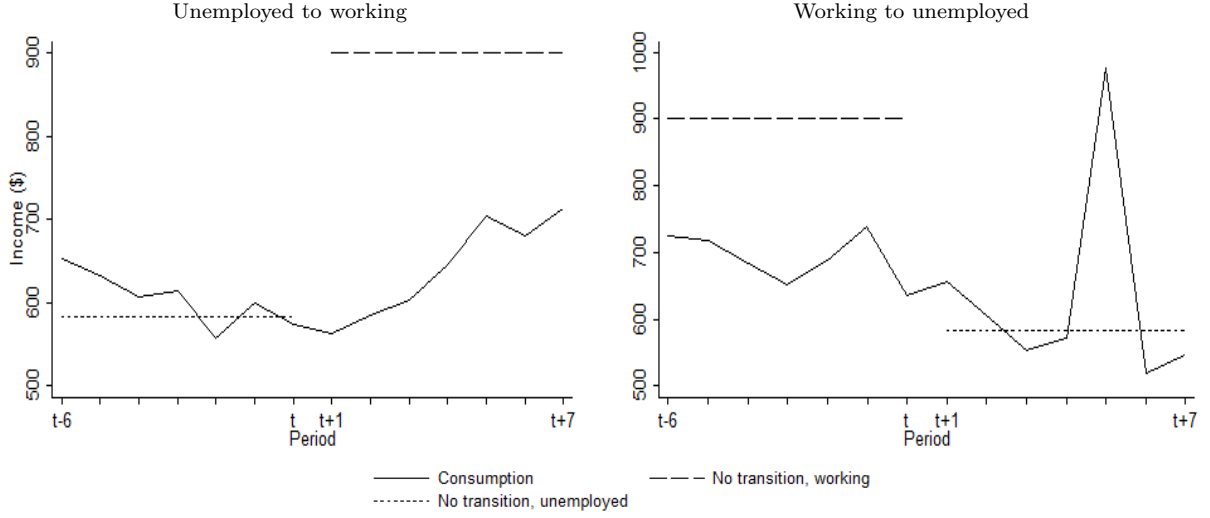
Based on Figure 3 it can be concluded that the immediate effect of a transition on present income is quite large. Nevertheless, one may argue that a transition does not necessarily entail a significant change in lifetime resources. For instance, assuming that an unemployment spell on average lasts 6 months the resulting immediate income loss amounts to less than 15,000 Euro on average which is likely to be a trivial fraction of the average expected lifetime income. If the decrease in average expected lifetime income due to becoming unemployed is equal to this amount, PILCH implies that consumption should be reduced by only a small margin upon becoming unemployed. Given the noise in the data this marginal change in consumption could be hard to detect. On the other hand, it can be argued that the effect of a transition on lifetime resources is likely to exceed the immediate income loss. In other words, it is possible that transitions between the employment and unemployment states may have a long-term impact on lifetime resources which is not reflected in Figure 3. In the literature, such adverse and persistent effects of unemployment on future income are often referred to as scarring. Stevens (1997), for example, estimates the impact of unemployment on future earnings and finds that six or more years after unemployment American workers earn 9% less than the amount that they would earn in the absence of unemployment. Similarly, Arulampalam (2001) finds that in Britain earnings are 14% lower three years after unemployment. In the light of these findings, it can be argued that transitions between the unemployment and employment states are important life events which could require sizable consumption adjustments.

In addition to the income trajectories of those who experience the transition, Figure 3 also depicts the average household income levels of individuals who remained employed and those who remained unemployed throughout the period of interest. These two values are indicated by the

dashed and dotted lines respectively. We examine the income trajectory of the individuals who have experienced the transition in comparison to the average household income levels of the two non-transition groups. The figure suggests that the respondents who have always been employed have higher household income compared to the respondents who lose their jobs and those who find a job. This pattern could arise because of several reasons. For instance, it could be that low-income households are more likely to lose their jobs compared to high-income households. It is also plausible that income and the probability of being unemployed are determined by a common factor such as education or, more broadly, human capital. In contrast, the average household income levels of the unemployed respondents who do not experience the transition and those who experience the transition are much closer.

In Figure 4, the exercise in Figure 3 is repeated using household consumption. The solid line depicts the trajectory of household consumption while the dashed and dotted lines mark the average consumption levels of the respondents who are observed only as employed and those who are observed only as unemployed respectively. According to the figure, in general household consumption follows a smoother trajectory although there are exceptions such as period  $t+5$  in the right panel. The relatively smooth change in consumption at the time of the transitions suggests that consumption is smoothed at least to some extent. As expected, consumption expenditures seem to correlate with the household income levels before and after the transition. In general, it follows a declining trajectory in the case of unemployment and an increasing trajectory in the case of employment. Furthermore, at the month of transition there is a mild change in average household consumption expenditures in the expected direction. Employed individuals who do not experience a transition spend more than those who experience a transition which mirrors the income differences between these two groups. There is little difference between the unemployed who experience a transition and those who do not, in terms of household consumption expenditures as well as income. Although consumption expenditures follow a smoother trajectory compared to income, Figures 3 and 4 do not necessarily imply that the trajectory of consumption is in line with the PILCH. One of the predictions of the theory is that the anticipated changes in income should be fully smoothed which can only be tested by distinguishing between anticipated and

**Figure 4:** Average consumption expenditures before and after transitions



Notes: The transition takes place between period  $t$  and  $t+1$ . In periods before  $t$ , the average is taken over individuals who are in the original state and in periods after  $t+1$  it is taken over individuals who are in the post-transition state.

unanticipated changes in income. We test this particular prediction of the PILCH in the following sections.

## 4 Predictive power of subjective transition probabilities

In this section we construct two variables which capture only the anticipated changes in employment status. To this end we use the inferred subjective probabilities ( $p$ ) which are discussed in section 2.3. These measures are used in section 6 to test whether consumption behaviour is sensitive to these anticipated changes. As a first step, we analyse whether the subjective transition probabilities are related to future employment and unemployment. If such a relationship does not exist, it can be concluded that the changes in the employment status are not expected. The descriptive evidence in Figure 1 suggests that the changes in the employment status are anticipated at least to some degree. To test this claim formally, we estimate two models in which we regress the respective transition variables of the following month on subjective transition probabilities.

**Table 2:** Change in employment status. Probit marginal effects at mean

	Become employed <sub>t+1</sub>		Become unemployed <sub>t+1</sub>	
	(1)	(2)	(3)	(4)
Prob. of losing job <sub>t</sub>			0.032*** (0.002)	0.029*** (0.002)
Prob. of finding job <sub>t</sub>	0.139*** (0.018)	0.116*** (0.018)		
$\Delta$ Household size <sub>t+1</sub>		-0.017 (0.017)		-0.001 (0.002)
$\Delta$ Health <sub>t+1</sub>		0.015 (0.011)		0.000 (0.001)
$\Delta^+$ Single <sub>t+1</sub>		0.148 (0.212)		0.010 (0.016)
$\Delta^-$ Single <sub>t+1</sub>		0.142 (0.138)		-0.002 (0.005)
Spouse become employed <sub>t</sub>		0.049 (0.052)		0.016** (0.006)
Spouse become unemployed <sub>t</sub>		-0.009 (0.046)		0.026** (0.012)
Age in months <sub>t</sub>		-0.000*** (0.000)		-0.000*** (0.000)
Time dummies	No	Yes	No	Yes
N	2768	2768	31218	31218
Log-likelihood	-954.122	-916.983	-1528.506	-1477.525

Robust standard errors are reported.

The first model deals with the case of job finding whereas the second model deals with the case of job loss. In both models, we only consider the cases where the respondent may experience the transition in question. That is to say, in the first model the sample consists of cases where at the beginning of the sample period the respondents are unemployed and in the second model the sample includes only those cases where at the beginning of the sample period the respondents are employed. With a slight abuse of notation, we refer to the initial month as  $t$  and the following month as  $t+1$ . To measure the transitions from employment to unemployment, we use an indicator variable which takes the value 1 if a working individual becomes unemployed in  $t+1$  and 0 otherwise.

In Table 2 the transition variables are regressed on the subjective job finding and job loss probabilities. Under the assumption of rational expectations, forecast errors should be distributed randomly with zero mean. This assumption suggests that, when the transition variables are regressed on the lags of the one-month job finding and job loss probabilities, as in Table 2, the slope coefficients should be equal to 1 and the intercept terms should be equal to 0. A positive slope coefficient which is lower than 1, would indicate that the labour market transitions are only partially predicted. According to the regression results which are presented in the first and third columns of Table 2, there is a positive and statistically significant relationship between the actual labour market transitions and the subjective transition probabilities, although the coefficients are considerably lower than 1. The results in the first and third columns suggest that the actual probability of becoming employed increases by 13.9% when the subjective probability of becoming employed increases from 0 to 1. In the case of becoming unemployed, a similar increase in the subjective probability is associated with a 3.2% increase in the actual probability of becoming unemployed in the next month. In both cases the relationship between the subjective transition probabilities and realizations is statistically significant and is in the expected direction.

The subjective transition probabilities can be regarded as valid instruments for distinguishing the anticipated component of transitions, only if they predict actual transitions conditional on other observable characteristics. To test the validity of the subjective transition expectations as instruments we introduce a set of explanatory variables including demographic characteristics

and time effects. In these estimations we control for age, period effects, the changes in household size, health indicator, marital status and spouse's employment status between month  $t$  and  $t+1$ . Changes in the marital status is captured by "Become single" and "Become married". When demographic characteristics and time-effects are controlled for (column 2 and 4) the coefficients of interest remain positive and statistically significant. The coefficient of the subjective job finding probability decreases to 11.6% while the coefficient of the subjective job loss probability declines slightly to 2.9%. Although both coefficients are lower than 1, the estimation results show that the subjective transition probabilities have considerable predictive power even when other relevant factors are controlled for. In both specifications age enters with a negative, statistically significant coefficient suggesting that young respondents are more likely to experience a transition. According to the results in the fourth column, the likelihood of unemployment increases significantly both when the spouse finds a job and when the spouse loses his/her job. This could suggest that some respondents leave their job voluntarily due to relocation. However, in the second column we do not find such a significant relationship between spouse's transitions and the likelihood of becoming employed. The other characteristics that we consider do not have a statistically significant effect. The results reported in the second and fourth columns constitute the first stage of the two-stage-least-square (2SLS) estimation which is explained in sections 5 and 6.

## 5 Anticipated employment transitions and income

We are interested in the change in income before and after the employment transitions for two reasons. Firstly, transitions may be associated with unanticipated income shocks which may lead to a co-movement of income and consumption according to the life-cycle theory. Secondly, even if the transitions and therefore the income changes associated with the transitions are anticipated, consumption expenditures of hyperbolic discounters may still track their income. Since hyperbolic discounters are tempted to over-consume, they may benefit from holding their assets in illiquid form. Therefore, it is possible that hyperbolic households have low levels of liquid wealth, which can be consumed immediately, and rather have illiquid wealth, which functions as a commitment



**Table 3:** Change in income at the time of the transitions

	$\Delta \ln \text{ Total income}_{t+1}$			
	(1) OLS	(2) 2SLS	(3) OLS	(4) 2SLS
Become employed $_{t+1}$	0.379*** (0.069)	1.248* (0.667)		
Become unemployed $_{t+1}$			-0.326*** (0.065)	-0.694 (0.442)
$\Delta \text{ Household size}_{t+1}$	-0.004 (0.091)	0.024 (0.099)	0.004 (0.013)	0.005 (0.013)
$\Delta \text{ Health}_{t+1}$	-0.046 (0.042)	-0.036 (0.047)	0.000 (0.007)	0.000 (0.007)
Become single $_t$	0.146 (0.112)	0.294* (0.178)	-0.176 (0.115)	-0.170 (0.116)
Become married $_t$	-0.209 (0.402)	-0.361 (0.449)	0.078* (0.042)	0.075* (0.042)
Spouse become employed $_t$	-0.734* (0.404)	-0.772** (0.386)	-0.066** (0.026)	-0.063** (0.026)
Spouse become unemployed $_t$	0.119 (0.163)	0.097 (0.205)	0.025 (0.031)	0.029 (0.031)
Age in months $_t$	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Constant	4.707 (3.715)	-5.464 (8.860)	0.431 (0.535)	0.419 (0.532)
Time dummies	Yes	Yes	Yes	Yes
N	1423	1409	29700	29700

Robust standard errors are reported.

device. According to Angeletos et al.(2001), this tendency of hyperbolic households to hold relatively less liquid wealth could limit their ability to react to income changes and lead to consumption-income co-movement. The authors argue that, because of the limited ability of hyperbolic households' to smooth consumption, the consumption of hyperbolic households could co-move with their anticipated income as well as their unanticipated income. We explore these possibilities in the remainder of this paper.

Both of the arguments discussed above predict a positive correlation between income and consumption at the time of employment transitions, provided that these transitions are accompanied with changes in household income. It is therefore of interest whether income changes when an unemployed individual finds a job and when an employed individual loses his job as suggested in Figure 3. In Table 3, it is statistically tested whether income is sensitive to changes in the employment status by regressing the change in household income on the transition indicators. The effects of becoming employed and becoming unemployed are reported in the first two and last two columns respectively. The overall effect of the transitions on income is examined in the first and third columns whereas the second and fourth columns display the effect of anticipated transitions on income, which will be discussed later. According to the results in the first and third columns of Table 3, conditional on the control variables, income changes significantly at the time of transitions from unemployment to employment as well as transitions from employment to unemployment. As can be seen on Figure 3, on average, household income increases by 41.6% when the respondent finds a job and decreases by 13.5% when he becomes unemployed.

Since transition dummies capture the monthly change in household income between the transition months, the corresponding coefficients are likely to understate the overall impact of the transition on lifetime income. Firstly, as Figure 3 suggests, after the transition event the adjustment of household income takes more than a month. Secondly, it is likely that the transition events have a long lasting impact on income which cannot be easily quantified. Other studies such as Mroz and Savage (2006) estimate that a 6 month unemployment spell experienced at the age of 22 is associated with a 8% lower income one year later and a 3% lower income ten years later. It is therefore likely that the long-term income effects of employment transitions by far

exceed the short-term income effects reported in Table 3.

The PILCH suggests that consumption could be correlated with unanticipated income changes but not with anticipated income changes. However, if households have hyperbolic time-preferences rather than exponential preferences as in the standard PILCH, we may also observe a correlation between anticipated income and consumption changes. It is therefore important to distinguish between unanticipated and anticipated income changes and measure the extent to which the income changes at the time of the transitions are anticipated. Ideally, such a distinction between unanticipated and anticipated income changes can be made using subjective income expectations. Since we do not have this information, instead, we regress the changes in household income on the anticipated employment and unemployment measures developed in the previous section. This allows us to compare the change in income resulting from the overall change in the employment status and the change in income resulting from the anticipated change in the employment status.

The definitions of the "Become employed" and "Become unemployed" variables are different in the even and odd numbered columns of Table 3. In the second and fourth columns we examine whether income is sensitive to anticipated changes in the employment status. To measure these anticipated changes we devise a 2-stage estimation procedure. In the first stage, we regress the respective transition variables on inferred probabilities ( $p$ ), while controlling for demographic characteristics. Therefore, the second and fourth specifications in Table 2 correspond to the first stage of our two stage estimation. The predicted values from the first stage are then used as instruments in the second stage.<sup>4</sup> These predicted values capture the anticipated changes in the employment status, since the unanticipated changes are filtered out in the first stage using the subjective transition probabilities. The second stage estimations are reported in Table 3. According to the estimation results, the coefficients which measure the effect of anticipated employment and anticipated unemployment on household income both have the expected sign but only the anticipated unemployment measure is statistically significant. Furthermore, both estimates are larger than their OLS counterparts in absolute terms. Overall, the results suggest that the in-

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<sup>4</sup>Since we exploit the binary nature of the dependent variable in the first stage estimation, this procedure could produce more efficient estimates. See chapter 18 in Wooldridge (2001) for a detailed discussion.

come changes at transitions can be at least partly explained by the anticipated employment and unemployment measures.

In all four specifications reported in Table 3, household income decreases significantly when the spouse finds a job. This finding seem to suggest that the spouse's employment decision is affected by changes in household income and not the other way around. That is to say, it could be that spouses of the respondents anticipate the drop in income and start looking for a job to compensate for the loss. It is nevertheless not entirely clear why this variable enters with a negative sign.

## 6 Anticipated employment transitions and consumption

Life-cycle theory provides a general theoretical framework in which household consumption decisions can be examined. If lifetime utility,  $U$ , has the property of intertemporal additive separability, similar to Banks et al. (1998) and Bernheim et al. (2001) we can write it as a function of within-period utility as follows:

$$U = \sum_{t=s}^T \frac{1}{1 + (\delta_0 + \delta_1 X_{1it})} u(C_{it}), \quad (2)$$

where  $T$  is the lifetime of the household and  $\delta_0 + \delta_1 X_{1it}$  is the time-preference rate which is allowed to depend on household characteristics such as the age of the respondent. It is assumed that within-period utility,  $u(\cdot)$ , exhibits constant relative risk aversion (CRRA) and depends only on current household consumption such that:

$$u(C_{it}) = e^{\theta_0 + \theta_1 X_{2it}} \frac{C_{it}^{1-\rho}}{1-\rho}, \quad (3)$$

where  $e^{\theta_0 + \theta_1 X_{2it}}$  is a scale factor,  $X_{2it}$  are demographic variables and  $\rho$  measures the degree of risk aversion which is assumed to be the same for each household in the sample. Using the

first-order optimality conditions and the envelope condition it can be shown that in each period the optimal consumption decision satisfies the Euler equation:

$$E_t \left[ \frac{(1 + \delta_0 + \delta_1 X_{1it+1}) e^{-\theta_1(X_{2it+1} - X_{2it})}}{1 + r_t} \left( \frac{C_{it+1}}{C_{it}} \right)^\rho \right] = 1, \quad (4)$$

which can be written as:

$$\frac{(1 + \delta_0 + \delta_1 X_{1it+1}) e^{-\theta_1(X_{2it+1} - X_{2it})}}{1 + r_t} \left( \frac{C_{it+1}}{C_{it}} \right)^\rho = 1 + \varepsilon_{i,t+1}, \quad (5)$$

where  $r_t$  is the real interest rate and  $\varepsilon_{i,t+1}$  captures the forecast error. Taking the natural logarithm of (5) leads to:

$$\ln C_{it+1} - \ln C_{it} \equiv \Delta \ln C_{it+1} = \alpha_1 X_{1it+1} + \alpha_2 \Delta X_{2it+1} + \alpha_3 r_t + \alpha_4 + \epsilon_{it+1}, \quad (6)$$

where  $\alpha_1 = \frac{-\delta_1}{\rho}$ ,  $\alpha_2 = \frac{\theta_1}{\rho}$ ,  $\alpha_3 = \frac{1}{\rho}$ ,  $\alpha_4 = \frac{-\delta_0}{\rho}$  and  $\epsilon_{it+1}$  reflects the transformed forecast error such that:

$$\epsilon_{it+1} = -\frac{\ln(1 + \varepsilon_{it+1}) - E_t \ln(1 + \varepsilon_{it+1})}{\rho} \quad (7)$$

Following Banks et al.(1998), it is assumed that  $E_t \ln(1 + \varepsilon_{it+1})$  is constant across time and households, so that it can be included in the intercept term  $\alpha_4$ .<sup>5</sup> The forecast error,  $\epsilon_{it+1}$ , includes unanticipated shocks to preferences as well as to relevant economic variables such as income, inflation and interest rate. It is assumed that the forecast error,  $\epsilon_{it+1}$ , is composed of an aggregate and an idiosyncratic shock which are additively separable. In the estimations of equation (6) that are reported in Table 4, time dummies are introduced to capture the aggregate component of the expectation error in addition to the interest rate  $r_t$ . In the first four columns of Table 4, we use total consumption expenditures as the measure of consumption. In the last four columns we focus only on food expenditures.<sup>6</sup> The odd numbered columns in Table 4 correspond to OLS models where we do not make a distinction between anticipated and unanticipated changes in the

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<sup>5</sup>The plausibility of this assumption is discussed in Carroll (2001) and Attanasio and Low (2004). Since Banks et al. (1998) use synthetic cohorts, they assume that  $E_t \ln(1 + \varepsilon_{it+1})$  is constant across cohorts rather than households.

<sup>6</sup>Our results are largely unchanged when we include relatively durable consumption expenditures such as expenditures on hobby equipments, gardening equipments etc.

employment status, that is we use "Become employed" and "Become unemployed" as explanatory variables. In the even numbered columns we focus only on anticipated changes in employment status and therefore these two variables have a different definition than in the odd numbered columns. Since we filter out the unanticipated changes in employment status in the first-stage of the estimation, in the even numbered columns, these variables correspond to anticipated transitions to employment and unemployment status respectively. We filter out the unanticipated component of these transitions by first regressing the transition variables on inferred probabilities ( $p$ ), as in the previous section. The second and fourth specifications in Table 2 correspond to the first stage of our two stage estimation. The predicted values from the first stage estimation are then used as instruments in the second stage estimation. These predicted values used that are used as instruments capture only the anticipated transitions between employment and unemployment states under the given assumptions. Equation (6) states that consumption growth is independent of employment status of the household members, provided that the employment status in period  $t$  is perfectly predicted in period  $t-1$ . Therefore, it is expected that the coefficients of the anticipated transition variables are zero. Although PILCH does not make a clear prediction about the coefficients of the transition variables, these coefficients may still serve as a benchmark. If the change in consumption is insensitive to the transition in general than it is unlikely to be sensitive to the anticipated transition.

**Table 4:** Labour market transitions and consumption

	$\Delta/n$ Total consumption $_{t+1}$				$\Delta/n$ Food consumption $_{t+1}$			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
Become employed $_{t+1}$	0.086*** (0.033)	0.206 (0.257)			0.071** (0.036)	-0.055 (0.312)		
Become unemployed $_{t+1}$			-0.082*** (0.025)	0.094 (0.160)			-0.037 (0.030)	0.136 (0.182)
$\Delta$ Household size $_{t+1}$	0.018 (0.036)	0.020 (0.036)	-0.013 (0.010)	-0.013 (0.010)	0.001 (0.039)	-0.001 (0.039)	-0.004 (0.013)	-0.004 (0.013)
$\Delta$ Health $_{t+1}$	-0.028 (0.021)	-0.030 (0.021)	0.004 (0.005)	0.004 (0.005)	0.023 (0.023)	0.024 (0.023)	0.015** (0.006)	0.014** (0.006)
Become single $_t$	0.063 (0.274)	0.048 (0.275)	0.004 (0.058)	0.003 (0.058)	0.422 (0.334)	0.405 (0.335)	0.037 (0.068)	0.035 (0.068)
Become married $_t$	-0.090 (0.184)	-0.115 (0.190)	-0.146** (0.057)	-0.146** (0.057)	-0.295 (0.205)	-0.265 (0.217)	-0.164** (0.069)	-0.165** (0.069)
Spouse become employed $_t$	-0.111 (0.083)	-0.118 (0.084)	-0.013 (0.020)	-0.017 (0.020)	-0.051 (0.090)	-0.047 (0.090)	-0.008 (0.023)	-0.011 (0.024)
Spouse become unemployed $_t$	0.074 (0.095)	0.073 (0.094)	-0.073** (0.029)	-0.079*** (0.030)	0.031 (0.101)	0.032 (0.101)	-0.042 (0.035)	-0.048 (0.035)
Age in months $_t$	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Constant	0.491 (1.625)	-0.115 (2.215)	0.630 (0.386)	0.593 (0.390)	-0.564 (1.797)	0.302 (2.812)	0.448 (0.454)	0.430 (0.458)
Time dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2768	2768	31218	31218	2654	2654	30778	30778
R <sup>2</sup>	0.019	0.014	0.022	0.020	0.017	0.012	0.008	0.007

According to the results in the first and third columns of Table 4, consumption expenditures change significantly in the predicted direction when the respondents become unemployed and when they find a job. We also find that household consumption decreases when the respondent is married. It can be speculated that at the time of marriage this decline in non-durable consumption could be compensated by an increase in durable consumption. However, we do not have direct evidence to support this view. The results in the third column also indicate that transition of the spouse to unemployment is associated with a significant decline in consumption as it is expected.

As explained in the previous section, the changes in consumption at transitions may be compatible with the life-cycle theory if the transition is associated with an unanticipated income change. To rule out this possibility, the predicted values from the first stage are used as instruments in the second-stage regression. Since unanticipated shocks are ruled out in the second and fourth columns, the transition variables can also be referred to as anticipated employment and anticipated unemployment respectively. According to the results in the second and fourth columns, both transition variables are statistically insignificant. Therefore, we cannot reject the hypothesis that consumption behaviour is compatible with the PILCH. The results in column 4 also suggest that marriage and transition of the spouse to unemployment are both associated with a drop in consumption, as in column 3.

As discussed in the previous sections, food expenditures may be particularly sensitive to changes in the employment status, even if total consumption is in line with the predictions of PILCH. According to this line of argument, consumption expenditures may depend on the labour market status since some consumption goods can be produced at home by using time as an input. If this proposition is true, consumption expenditures, especially food expenditures, may decline abruptly after becoming unemployed even though the actual consumption trajectory is in line with the predictions of the life-cycle theory. Given the available information in consumption surveys it is often not possible to verify the validity of this argument. By using data from food-diaries, Aguiar and Hurst (2005) find that food intake does not deteriorate with retirement. They also argue that other studies find a decline in consumption expenditures at the time of retirement because food-expenditures is particularly sensitive to the amount of time that can be



allocated to non-market activities. To address this issue we use food expenditures as the measure of consumption in columns 5 to 8 and compared the results with those in the first four columns.

The estimation results in the fifth column show that food expenditures and total expenditures increase by a similar fraction when individuals become unemployed. However, according to the results in the seventh column food expenditures do not change significantly when individuals lose their jobs. Furthermore, according to the results in the sixth and eighth columns food expenditures, are also not sensitive to anticipated transitions between employment and unemployment states. Therefore, using food expenditures as a proxy for consumption we cannot reject the hypothesis that anticipated transitions have no effect on changes in consumption. The data supports the PILCH under both definitions of consumption that are considered. The results in the seventh and eight columns also suggest that improved health is associated with a significant increase in consumption whereas marriage is associated with a significant drop. The positive coefficient of the health variable supports the view that the respondents enjoy consumption more when they are more healthy.

## 7 Conclusion

Employment transitions are economically important events since both current income and possibly expected lifetime income are affected considerably when an individual becomes unemployed or when he finds a job. It is shown that consumption behaviour at the time of these labour market transitions is compatible with the simple version of the life-cycle theory. It is also found that responses given in subjective probability questions correlate strongly with labour market transitions one month ahead. These responses can therefore be used as instruments to distinguish anticipated and unanticipated monthly changes in the employment status. The added value of subjective probabilities is particularly high in a monthly setting since other individual characteristics do not correlate strongly with the job transitions in the next month.

It remains an important goal to explain the discrepancy between the subjective transition probabilities and employment transitions. This sizable gap between expectations and realizations

could reflect biased reporting behaviour on the part of the respondents. If this is the case, it may be possible to construct a model in which certain reporting biases, such as focal responses, are taken into account. This way expectations can be measured with greater accuracy and they can be exploited further.

We suggest that subjective probability questions should be followed by additional questions in which the respondents could explain their response. It is possible that some responses, especially focal responses, reflect the unwillingness of the respondent to answer the question. On the other hand, focal responses could also result from rounding. By asking follow up questions it could be possible to distinguish these two causes and understand the intentions of the respondents in subjective probability questions.

## References

- AGUIAR, M., AND E. HURST (2005): “Consumption versus Expenditure,” *Journal of Political Economy*, 113(5), 919–948.
- (2007): “Life-Cycle Prices and Production,” *American Economic Review*, 97(5), 1533–1559.
- AKERLOF, G. A., AND J. L. YELLEN (1985): “Unemployment through the Filter of Memory,” *The Quarterly Journal of Economics*, 100(3), pp. 747–773.
- ANGELETOS, G.-M., D. LAIBSON, A. REPETTO, J. TOBACMAN, AND S. WEINBERG (2001): “The Hyperbolic Consumption Model: Calibration, Simulation, and Empirical Evaluation,” *The Journal of Economic Perspectives*, 15(3), pp. 47–68.
- ARULAMPALAM, W. (2001): “Is Unemployment Really Scarring? Effects of Unemployment Experiences on Wages,” *The Economic Journal*, 111(475), pp. F585–F606.
- ATTANASIO, O. P., AND H. LOW (2004): “Estimating Euler equations,” *Review of Economic Dynamics*, 7(2), 406 – 435.
- BANKS, J., R. BLUNDELL, AND S. TANNER (1998): “Is There a Retirement-Savings Puzzle?,” *American Economic Review*, 88(4), 769–88.
- BERNHEIM, B. D., J. SKINNER, AND S. WEINBERG (2001): “What Accounts for the Variation in Retirement Wealth among U.S. Households?,” *American Economic Review*, 91(4), 832–857.
- BLAU, D. M. (2008): “Retirement and Consumption in a Life Cycle Model,” *Journal of Labor Economics*, 26(1), pp. 35–71.
- BROWN, J. R., C. C. COILE, AND S. J. WEISBENNER (2010): “The Effect of Inheritance Receipt on Retirement,” *The Review of Economics and Statistics*, 92(2), 425–434.
- CAMPBELL, D., A. CARRUTH, A. DICKERSON, AND F. GREEN (2007): “Job insecurity and Wages,” *Economic Journal*, 117(518), 544–566.

- CARROLL, C. D. (1997): “Death to the Log-Linearized Consumption Euler Equation! (And Very Poor Health to the Second-Order Approximation),” Working Paper 6298, National Bureau of Economic Research.
- DICKERSON, A., AND F. GREEN (2012): “Fears and Realisations of Employment Insecurity,” *Labour Economics*, 19(2), 198 – 210.
- FARBER, H. S., AND R. G. VALLETTA (2013): “Do Extended Unemployment Benefits Lengthen Unemployment Spells? Evidence from Recent Cycles in the U.S. Labor Market,” NBER Working Papers 19048, National Bureau of Economic Research, Inc.
- FRIEDMAN, M. (1957): *A Theory of the Consumption Function*, no. frie57-1 in NBER Books. National Bureau of Economic Research, Inc.
- GAN, L., M. D. HURD, AND D. L. MCFADDEN (2005): “Individual Subjective Survival Curves,” in *Analyses in the Economics of Aging*, NBER Chapters, pp. 377–412. National Bureau of Economic Research, Inc.
- HAIDER, S. J., AND M. STEPHENS (2007): “Is There a Retirement-Consumption Puzzle? Evidence Using Subjective Retirement Expectations,” *The Review of Economics and Statistics*, 89(2), 247–264.
- HURD, M. D., AND K. MCGARRY (2002): “The Predictive Validity of Subjective Probabilities of Survival,” *Economic Journal*, 112(482), 966–985.
- HURD, M. D., AND S. ROHWEDDER (2006): “Some Answers to the Retirement-Consumption Puzzle,” NBER Working Papers 12057, National Bureau of Economic Research, Inc.
- (2012): “Measuring Total Household Spending in a Monthly Internet Survey: Evidence from the American Life Panel,” NBER Working Papers 17974, National Bureau of Economic Research, Inc.
- JÜRGES, H. (2007): “Unemployment, Life Satisfaction and Retrospective Error,” *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, 170(1), pp. 43–61.

- KLEINJANS, K. J., AND A. V. SOEST (2014): “Rounding, Focal Point Answers and Nonresponse to Subjective Probability Questions,” *Journal of Applied Econometrics*, 29(4), 567–585.
- LUNDBERG, S., R. STARTZA, AND S. STILLMAN (2003): “The retirement-consumption puzzle: a marital bargaining approach,” *Journal of Public Economics*, 87(5-6), 1199–1218.
- MAESTAS, N. (2010): “Back to Work: Expectations and Realizations of Work after Retirement,” *J. Human Resources*, 45(3), 718–748.
- MANSKI, C. F. (2004): “Measuring Expectations,” *Econometrica*, 72(5), pp. 1329–1376.
- MATHIOWETZ, N. A., AND G. J. OUNCAN (1988): “Out of Work, Out of Mind: Response Errors in Retrospective Reports of Unemployment,” *Journal of Business & Economic Statistics*, 6(2), 221–229.
- MODIGLIANI, F., AND R. BRUMBERG (1954): *Post-Keynesian Economics*. Rutgers University Press.
- MROZ, T. A., AND T. H. SAVAGE (2006): “The Long-Term Effects of Youth Unemployment,” *Journal of Human Resources*, 41(2).
- SALM, M. (2010): “Subjective Mortality Expectations and Consumption and Saving Behaviours Among the Elderly,” *Canadian Journal of Economics*, 43(3), 1040–1057.
- STEPHENS, M. (2004): “Job Loss Expectations, Realizations, and Household Consumption Behavior,” *The Review of Economics and Statistics*, 86(1), 253–269.
- STEVENS, A. H. (1997): “Persistent Effects of Job Displacement: The Importance of Multiple Job Losses,” *Journal of Labor Economics*, 15(1), pp. 165–188.
- WOOLDRIDGE, J. M. (2001): *Econometric Analysis of Cross Section and Panel Data*.